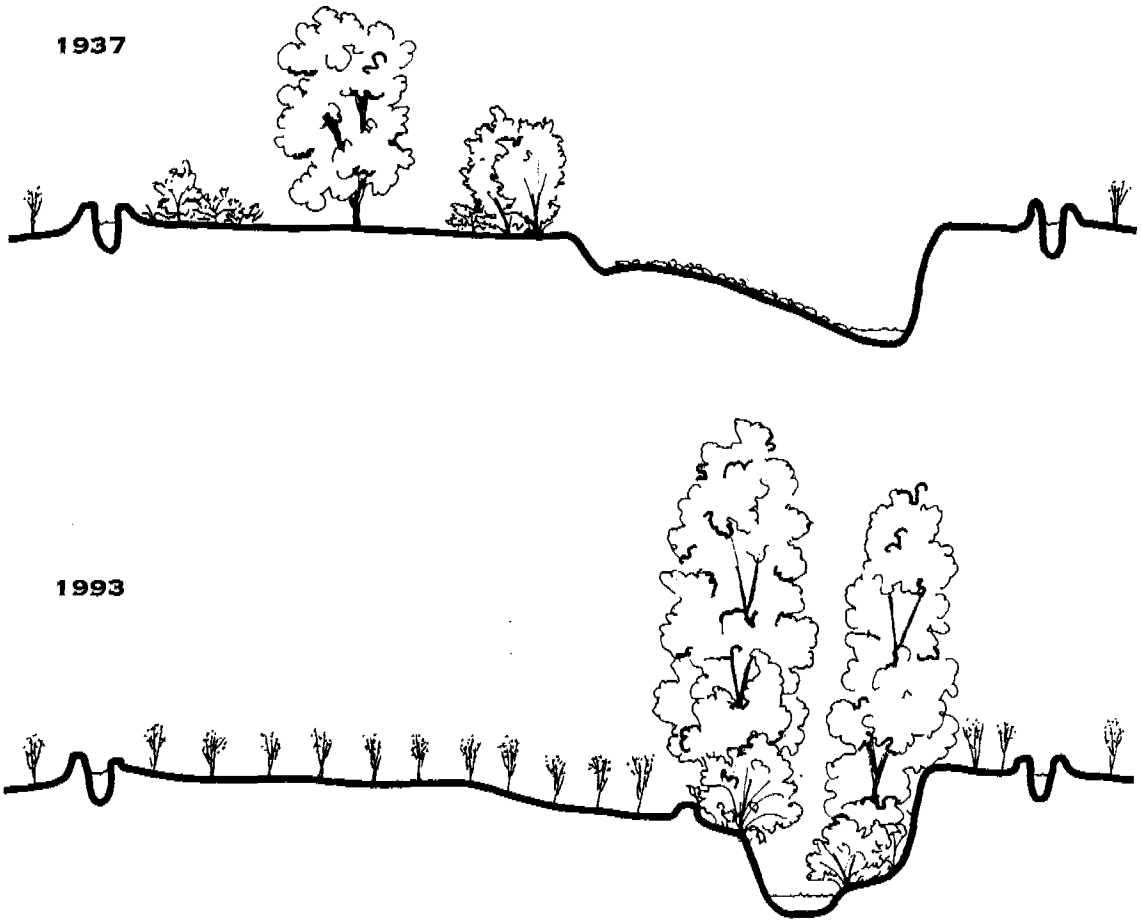
HISTORICAL RIPARIAN HABITAT CONDITIONS OF THE SAN JOAQUIN RIVER

Friant Dam to the Merced River



SAN JOAQUIN RIVER RIPARIAN HABITAT RESTORATION PROGRAM

Participants:

Friant Water Users Authority
Natural Resources Defense Council
Pacific Coast Federation of Fishermen's Associations
U.S. Bureau of Reclamation
U.S. Fish and Wildlife Service

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April 1998

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Summary

Soil surveys, historical maps, and historical aerial photographs were used to analyze the changes in riparian habitats and adjacent land uses along the 149-mile reach of the San Joaquin River between Friant Dam and the confluence with the Merced River. A 53,883-acre study corridor was created around the mainstem of the river, and five study reaches were established based on differences in hydrology and geomorphology; the average width of the study reaches ranged from 2,300 to 3,500 feet. Rectified maps at a scale of 1:24,000 were compiled for riparian soils and for riparian habitat and land use types for 1937, 1957, 1978, and 1993. The data were entered into a geographic information system database, and changes in the area of riparian soils and riparian habitat and land use types were quantified for each of these years.

Sixty percent of the study area has soils suitable for riparian habitats. Between 1937 and 1993, the area of riparian forest and scrub decreased from 6,787 to 4,914 acres, a 28% reduction, and the area of herbaceous riparian vegetation and marsh decreased from 4,076 to 738 acres, an 82% reduction. The canopy structure of the riparian vegetation changed substantially between 1937 and 1993. On average, forests became more dense and scrub became more open. The area of exposed sand and gravel along the river decreased by 73% in this period as a result of the encroachment of woody riparian vegetation. These changes are consistent with a sharp decline in natural flood disturbance (i.e., flood scour and deposition).

Between 1937 and 1993, the area of agricultural and disturbed land increased from 37,725 to 39,596 acres, a 5% increase, while urban and industrial land use acreage, including aggregate mining, increased from 300 to 2,581 acres, an 860% increase. The largest acreage changes occurred between 1937 and 1957.

Two study reaches showed a decline in riparian scrub and an increase in riparian forest, suggesting a vegetation succession to mature forest that had been prevented by periodic flooding prior to the building of Friant Dam, or may be the result of increasing water table depth. The data suggest that in the upper reach (i.e., the reach closest to Friant Dam), succession from cottonwood riparian forest to mixed riparian forest and then to valley oak riparian forest occurred, perhaps as a result of greater mortality of cottonwoods and willows than of oaks. The reaches with an increase in forest also showed the greatest decline in exposed gravel and sand because of riparian encroachment on the channel as a result of the lack of scouring floods. Willow species play a major role in this encroachment. Since 1957, a substantial increase in riparian scrub and herbaceous riparian vegetation and marsh has occurred in the San Luis National Wildlife Refuge.